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ABSTRACT

Results of a national survey of teachers, authors, administrators, distributors, and publishers reveal their perceptions of current needs and opportunities for development of microcomputer courseware for foreign language instruction. The study, which consisted of a literature review, a database review, a series of seven workshops, and consultation of a national advisory panel, is summarized. It was found that more needs than opportunities for materials development exist. The most wanted opportunity was more training in microcomputer-assisted instruction. The most-identified need was for more courseware, beyond the over 500 packages already available in 14 languages. Existing courseware was found to consist primarily of drill and practice and tutorials, with the remainder in games and simulation. Teacher preference was for drill and practice. Need was expressed for more prepublication quality control and improved evaluation and dissemination for teachers. Computer magazines were the main source of evaluations, with foreign language professional journals carrying little information. Teachers wanted cultural and civilization materials in addition to language skills materials, and were interested in open-ended or modifiable programs but not in the use of authoring languages. Better voice quality in the output of peripheral devices was also desired. Recommendations are made for software development, teacher training and support, developing capabilities, and the role of schools in influencing software development. (MSE)

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EXECUTIVE SUMMARY

Needs and Development Opportunities for Educational Software for Foreign Language Instruction in Schools*

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This report contains a summary of results. The full report, available through the Center for Educational Experimentation, Development and Evaluation, (CEEDE) includes the review of the literature and a more detailed explanation of the analyses and data. It is projected for publication and permission to do so has been requested.

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ABSTRACT

Needs and Development Opportunities for Educational Software for Foreign Language Instruction in Schools

(Contract #400820023)

The Executive Summary provides: an overview of the approach used, the findings, and recommendations.

Participants in the study, responding freely to their perceptions of the needs and development opportunities for microcomputer courseware for second language instruction, included teachers, authors, administrators, distributors, and publishers. All electronic data bases were searched as were publications and catalogs. Seven workshops were conducted. A National Advisory Panel reviewed plans and results.

In summary, more needs than opportunities were identified. The most wanted opportunity was more training involving microcomputer CAI. The strongest need expressed was for more courseware although over 500 different "packages" were located through searches made by the project. These covered 14 languages, related to 9 microcomputers (over 60% Apples), and appeared in several different modes of CAI. The most common mode was drill and practice (52%); next most common was tutorial, and least common were games and simulations. Teachers preferred drill and practice to all other modes.

Need was expressed for more pre-publication quality control, more and better evaluations available in sources to which foreign language teachers have convenient access. Computer magazines continue to be the main sources of evaluation and related information. Publications traditionally serving foreign language teachers carry little information, and the electronic data bases have much less than the printed publications, e.g., the catalogs of distributors and producers.

Foreign language teachers, in addition to CAI to teach language skills, want materials that teach their students about culture and civilization of the countries whose language they teach. Teachers want drill and practice materials and also "open ended" or "modifiable" software they can add to. They did not indicate any interest in using authoring languages or preparing courseware themselves. They want better voice quality in the output of peripheral devices.

Recommendations made relate to: software and courseware development; teacher training and support; developing capabilities; and the role of schools in influencing the developments in the field.

L.M.S.

INTRODUCTION

Foreign language instruction has been identified in recent reports (e.g. **A Nation at Risk**) as a component which needs to be included in the school curriculum if the quality of education in the United States is to improve. Consequently, there is increased interest in finding ways to improve second language instruction at all levels of schooling. Not only is help needed to provide instruction in the less commonly taught languages, but also to serve the increasing number of students enrolling in courses to learn the commonly taught languages. In the opinion of many, elementary school courses are needed, but too few foreign language teachers exist with competence to teach at that level.

One form of aid for foreign language instruction is Computer-Assisted Instruction (CAI). The present report summarizes the results of a comprehensive study to determine the needs and development opportunities for the use of microcomputers in foreign language instruction. It is a viable, useful, and effective means of instruction.

This project accomplished four objectives:

- Searched information sources and reviewed the pertinent publications on CAI;
- Determined what CAI mainframe and microcomputer courseware existed for instruction in foreign languages;
- Obtained data from a number of people who taught foreign languages, developed materials, or administered foreign languages programs, on what they perceived as the needs and development opportunities for foreign language microcomputer courseware;
- Analyzed courseware, evaluations, and information sources to determine needs and development opportunities.

The search for information sources was heavily concentrated on the microcomputer courseware. From September, 1982 through May, 1983, project personnel collected and analyzed information obtained from searching for the needs and development opportunities. Included in the searches were distributors, publishers, producers of microcomputer courseware, university and college departments using CAI in their language programs, State Education Agencies, State Supervisors of Foreign Languages, language organizations, foreign language teachers, and relevant administrators. [Several documents have been prepared with the information gathered. A list appears at the end of this report.]

METHODS AND APPROACHES

Information was collected in several ways. One was through the use of unstructured inquiry involving several small samples of knowledgeable people. The information obtained from the participants in workshops and provided through the mail was volunteered in a "free" response mode. Not only the volunteered information but also that obtained from the searches of project personnel involving a number of sources are summarized here both descriptively and using statistical procedures. The intention of this summary is to provide a general picture of the "state of the art" sufficient to reveal what is needed and what the opportunities are for new developments.

The seven methods used were:

1. Electronic database searches. On BRS of: BEBA, DISS, ECER, ERIC, NICH, PSYC, RICE, SMIE, SPIF, SSCI; on Dialog of: ERER, International Software Database, Language and Language Behavior Abstracts, MLA Bibliography, Microcomputer Index, PAIS International, SPIN, SSIE; and also, MICRO, the new database maintained by the National Clearinghouse for Bilingual Education.

2. Printed material searches. Professional foreign language journals, periodicals and over 100 microcomputer courseware catalogs.

3. Constituencies contacted:

   - 120 microcomputer courseware distributors including a number of producers.
   - 50 State Education Agencies and state supervisors of foreign languages.
   - 125 teachers and 27 administrators from seven different sites (at workshops) in the Midwest.
   - 55 additional teachers/administrators from other parts of the country via a flier.
   - Over 60 university/college departments using CAI in their language programs.
   - All major foreign language organizations.
   - Personnel attending the NEEC convention in Baltimore, Maryland.

4. Mailing of an open-ended flier. A flier describing the project and requesting comments on needs and opportunities was sent nationally to teachers, administrators, associations and publishers.

5. Workshops. Seven (7) workshops were conducted. Each provided participants (teachers, administrators, publishers, authors) with basic information on microcomputers, software and courseware, demonstrations and hands-on experience with second language courseware.

6. Meetings (two) with the project's National Advisory Panel. The Advisory Panel reviewed and recommended the approaches and methods followed by the project.

7. Oral report of project to a national audience at NECC in Baltimore, Maryland, a brief summary of which appeared in the article "Computers in the Classroom." (**Technology Illustrated**, Sept. 1983, pp. 39-46)

FINDINGS

Project findings on Needs and Development Opportunities:

1. Data from workshops and fliers.

It was found that:

- respondents provided many more comments on needs (92%) than on development opportunities (8%).

- of the 8% who commented on the opportunities, the majority felt that they needed more opportunities for training; therefore more workshops on the use of microcomputers and on applications to foreign language instruction were needed most--opportunities to obtain money/grants and release time for teachers so they can develop materials.

- the strongest need identified was for more courseware, particularly in the drill and practice format to teach: (a) grammar; (b) culture and civilization of the countries whose language was being learned; (c) games; and (d) bilingual materials, in that order.

- other needs also were identified and include: (a) more quality control over the courseware before release; (b) courseware which allows teachers to enter some of their own material; and (c) more, better, and easily accessible post-publication evaluations for teachers and administrators.

2. Data from searches

It was found that for second language microcomputer software:

- electronic databases were just being started when the project initiated its searches, and relatively little information about foreign language courseware is yet to be found in existing databases;

- most of the relevant information is contained in printed publications, typically catalogs and high technology publications;

- there exist over 500 microcomputer courseware titles for fourteen different languages (including ESL), for nine different microcomputers, using different CAI formats, and relating to a variety of levels of students;

- the largest amount of the identified courseware (30.3%) is for ESL. Among the other foreign languages, French materials are the largest percentage followed by Spanish and German, in that order;

- most (60.6%) of the identified courseware is for the Apple microcomputer. This courseware is available "locked," to be used with one Apple at a time. However, a fraction of this software, typically ESL and Spanish, is available "unlocked" so it can be used in an Apple-Corvus shared-memory system, with many (up to 64) Apples able to access a single disk. While the purchase price of the "unlocked" courseware is greater than the "locked," it actually costs less per student if the system has a moderate number of microcomputers, e.g., five or more;

- most (52.5%) of the courseware is drill and practice;

- thirty-four and four-tenths percent of the courseware is for the intermediate level student;

- forty-six and nine-tenths percent of the courseware is designed to teach grammar;

- very little (9.8%) of the courseware has been evaluated or reviewed, and reviews are not of uniform high quality, nor are they easily accessible to foreign language teachers;

- courseware that is designed to be modifiable by a user is preferred by many teachers but it costs more than the non-modifiable ("fixed") courseware. Courseware on diskettes is more expensive than on tape. The most expensive packages are those designed to teach ESL, Spanish and several different languages, i.e., the multilingual category.

- most courseware is copy protected, requiring the purchase of multiple copies for school use if large numbers of students are to be served by several microcomputers simultaneously. "Back up" copy policy is seldom stated in catalogs, but when back up disks are available, they are usually less expensive than the original. Most distributors provide only one back up disk.

STATE OF THE ART

For studies of CAI teaching a foreign language

What we perceive to be the current state of affairs in the use of computers in foreign language instruction is based on our observations, electronic searches, telephone inquiries and our analyses of data from published sources. This summary relates to five areas of interest: (1) development; (2) evaluation; (3) access by users; (4) school problems; and (5) projections of hardware and software.

1. Development

- Most microcomputer courseware continues to be developed as "stand-alone" material, to be used as a supplement to classroom instruction.

- More user-modifiable courseware is being developed, but little is available in general and very little is available for second language instruction.

- An increasing number of mainframe CAI materials to teach foreign languages are now in the process of being converted to microcomputer programs, but the number is not large, the rate is not rapid, and the product is often different in educational as well as in other ways.

- The courseware continues to be developed mainly for two microcomputers: Apple and TRS-80. The number of programs for the IBM PC while increasing, is very small and emerging very slowly.

- Most courseware is developed by non-teachers. (A common complaint about a foreign language program is that the vocabulary presented is either obsolete or improper.) The author's dilemma is current versus long-term adoption. Courseware that is designed to go with a currently popular text can become obsolete overnight if the text is significantly revised or if another text becomes more popular.

- As realization of the difficulty and high costs of producing courseware/ software from "scratch" is realized, more and more teachers are looking for modifiable courseware.

- Authoring languages, perhaps because of their requirement for some specialized computer knowledge, are not being widely considered for development of the foreign language courseware. They often process slowly, making the quality of a teacher's product less desirable for student use.

- Teachers as well as postsecondary school faculty who either have, or would like to develop, CAI materials for use with their classes, or for general distribution, find very little, if any, institutional incentive offered by their institution to encourage their development efforts. Some voiced their discontent indicative that courseware production is not considered to be a publication, nor is it viewed positively as a factor towards promotion by their peers or the administration. Many elementary and secondary teachers voiced concern that courseware development is an added load to a job that is already demanding.

- There is a proliferation of hangman or hangman-like formats in the foreign language courseware; games with educational value are not very available in general and even less available for second language instruction. Interest among foreign language authors, as in other areas, is growing for games and games are seen as market driven hype. Their instructional validity has not been determined.

- The number of different languages being served with microcomputer courseware is increasing. Some courseware for the less commonly taught languages has been or is being developed. One qualitative improvement provided by the microcomputer over the mainframe is its graphics capabilities. With the microcomputers, the display of special character sets required by many of the world's languages is much easier to accomplish and cheaper to do than with mainframe systems using CRTs.

2. **Evaluation**

The number of evaluations of courseware for foreign language instruction is very small, and what exists is not of uniformly high quality. Few in-depth evaluations are available to teachers. Worth noting is that:

- When this project began (summer, 1983), no evaluation of a foreign language package had been performed by EPIE or SMERC, and only one was available through MicroSIFT.

- Most evaluations have been informal, and although intended to provide a guide to the potential purchaser, are often of little real help in answering teachers' questions.

- Established professional language journals have failed to include microcomputer courseware information in their publications. Most evaluations are found in computer magazines and individual publications released by a school district or a university/college department.

- In-depth evaluations are increasing; electronic data base development is slow in its growth because of cost and the low priority of the area. In-depth evaluations provided by some sources are prepared by volunteers; other sources, usually more expensive, are typically paid for. Seldom, if ever, are reviews refereed and often they are made by one, two, or three conveniently available teachers.

- Computer magazines continue to be the main source of evaluations. Their quality and depth varies considerably.

3. Access by users

Courseware continues to improve in its "user-friendliness." More and more of the modifiable courseware provides prompts to the user. It was found, however, that:

- There is little consistency in the way in which courseware is packaged for the user. The industry has no agreed-upon standards;

- The quality of support materials, or "documentation," if available at all, differs considerably from package to package;

- Most support material simply tells the user how to put the disk in the microcomputer and related basic information about the computer, but not on how the package can best be used with students;

- Machine dependency of courseware needs to be brought to the attention of the purchaser. Many teachers and administrators are not yet aware of this problem. The simple rule that you find the software first and then buy the hardware that runs it, has not been as widely followed as it should be. There are many horror stories about purchasing the lowest priced hardware that can't run the needed software or courseware;

- Most of the courseware is designed for "stand alone" use. Instructional management systems for CAI exist, but their value is not appreciated by school personnel. Information about them needs to be disseminated more widely to foreign language teachers. Many are surprised to know that foreign language courseware even exists, let alone a management system which relieves them of many logistical and administrative tasks.

4. School problems

Given that computers have typically been first used in mathematics courses in a school, the equipment and expertise is typically in math and/or science. Furthermore, the primary use of microcomputers in schools is for computer literacy instruction, including computer programming. More and more of the teachers in the other curricular areas are asking the question, "How do our students get access to the computers?" The following has been observed:

- Except for bilingual programs, under the Bilingual Education Act Title VII of ESEA, computers are little used to teach in other language and culture areas;

- The use of microcomputers for language instruction is limited at the present time. Time available for language instruction via the computer is minimal, and is usually that time during which computers are not being used for math, computer literacy or programming;

- With increased enrollments in language classes and no increases in foreign language teachers, the use of microcomputers is becoming more appealing to many schools, and to many foreign language teachers. The primary problems are the small numbers of microcomputers in the school in relation to the number of students and the amount and scope of the available foreign language courseware;

- Many schools that could provide CAI for foreign language instruction find themselves constrained by the hardware they purchased before considering what courseware they wanted to use. If the school has Apples or TRS-80s there are some choices they can make among the available courseware for ESL and foreign language instruction, but even with these computers the choices of courseware (modifiable or non-modifiable) are few. They are virtually non-existent if the school purchased other microcomputers.

5. <u>Projections of hardware, software, and courseware</u>

"Intelligent" videodisks are controlled by microcomputers. Interactive videotape decks also are controlled by microcomputers. Both of these systems require special equipment and the expenditures required are questionable for most schools. Very little material is available now for teaching seond languages. Courseware is being developed for the use of more sophisticated interactive programming with such systems (e.g., Villa Alegre). Voice synthesizers and digitizers also are improving the richness of the sensory experiences provided by CAI courseware for foreign language instruction. The improvement of the courseware available for foreign language instruction is being achieved by the capability of the microcomputer to display the special character sets used by languages other than English.

Improvements in the short run on what is now available will be:

- Improved randox access, and interchangeability of computer generated and videotape produced images on a single display;

- Better voice outout quality for machine-produced speech (synthesizer), and greater storage capacity for randomly accessible digitized human speech;

- More prepublication evaluations and better and more post-publication evaluations. Modern language journals will publish these.

Improvements in the long run:

- Less costly production of videodiscs, modifiable to allow image and sound editing in the field;

- Sound (voice-overs, etc.) with single-image videodisc displays;

- More convenient and less costly ways of making courseware available on many different brands of microcomputers--improved software transferability;

- Inexpensive programmable keyboards permitting the learner to respond using special character sets for languages such as Russian, Japanese, Chinese and Indochinese;

- Voice input systems that are capable of being processed by microcomputers which can also provide voice output in the same, or a different language.

RECOMMENDATIONS

The recommendations which follow are based on the needs and opportunities identified by teachers and administrators, and those which the project identified or extrapolated from the literature. These recommendations cover: (a) software and courseware development; (b) teacher training and support; (c) development of new capabilities; and (d) the role of the schools.

1. Software and courseware development

- The development of software and/or hardware is needed to make it possible to transfer courseware from one brand of microcomputer to another with minimal reprogramming.

- A variety of efforts should be made to increase the use of quality practices by courseware developers; incentives and standards need to be developed that encourage them to produce better quality courseware.

- Efforts to achieve consensus among foreign language teachers on courseware specifications should be made so their standards can be used in the production of more and better materials by commercial sources. The development of criteria by teachers would encourage developers to produce quality courseware.

- More training opportunities for teachers are needed to show them how to: (1) Use courseware; (2) prepare their own materials, and (3) how to work with modifiable courseware.

- The development of a greater variety of educationally valid games and communication simulations, e.g. conversational interactions (dialogs) should be encouraged.

- Materials are needed for use in elementary level foreign language programs that serve to begin language instruction and function as motivators for the learning of foreign languages.

- The unique capabilities of the microcomputer that are more attuned to foreign language instruction should be incorporated in the courseware consistently and with special attention to objectives of language learning and the needs of learners, (e.g., the capabilities of DASHER).

2. Teacher training and support

- Teachers and administrators ought to be provided with pre-service and in-service training in the capabilities of the computer and how its capabilities can improve their productivity, student learning, and instructional record-keeping.

- Foreign language teachers, through both pre-service and in-service, should be trained to know how to use microcomputers, how to evaluate courseware, and what to expect from the courseware for their purposes.

- Teachers ought to be trained in the different ways they can use courseware in conjunction with their other classroom work, so the microcomputer experiences given their students provide maximum benefit to the learners.

- Videotapes containing examples of courseware can be used with advantage in pre-service and in-service workshops for teachers to introduce them to capabilities of the microcomputer for instruction. They can provide training to people who are otherwise difficult to reach or do not have any computer experience. Opportunities to develop such materials should be created and these materials could serve to improve the quality of CAI by demonstrating good models.

3. Developing Capabilities

- Selected teachers, in addition to those who teach mathematics and science, should have their teaching loads reduced so that they can have the time to be trained in the uses of the computer, computer programming, and in CAI, CMI and CAT. These teachers can, in turn, train other teachers and they can facilitate the implementation of CAI in school(s).

- Schools should seek ways to create resource units where teachers, in general, can have convenient access to courseware and hardware on a loan basis, to examine it before committing time and resources, and to get better informed.

- Special attention is needed to the availability of software/courseware for school programs. If there are minimal resources for development or no plans to develop courseware within the school, the choice of hardware is crucial. Schools and teachers in this situation need to look first at what courseware is available and then at what hardware (brand of microcomputer).

- Schools that plan to develop their own materials should consider all of the costs and resources needed knowing they are greater than required for developing print and very different from the development of print or A/V materials. Needed are a supporting team of content and technology specialists, including computer graphics and specialists for other peripherals such as voice. A set of course objectives, performance standards and evaluation procedures is critical to begin with.

- Schools and universities should collaborate on joint development projects to make best use of each other's resources and to create materials of mutual interest and use.

4. **The role of the schools**

- Schools should exert their influence to get courseware producers to provide data and other evidence of their products' ability to achieve particular instructional objectives.

- Schools should require the same high quality in the courseware they use whether it is from commercial producers or their own local (school) developers.

- Schools should provide opportunities and incentives for their teachers: (1) to learn about microcomputers; (b) to get involved in the use of computers in their course(s); (3) to become involved in formal courseware evaluations; and (4) to become involved in the development of courseware.

- Schools could improve their programs if they involved their teachers in the identification of areas in which CAI can be most useful, in setting purchase and use priorities, and by creating schedules that distribute the use of the school's microcomputers for instruction and instructional support activities such as testing and individualizing learning.

- Equitable access for the teachers in different areas of the curriculum should be a priority of the principal if widespread use of microcomputers is to be achieved.

- In acquiring and using microcomputers schools should give priority to providing as many students as possible the opportunity of experiencing the different uses of a computer.

- In order for microcomputers to be used for maximum school benefit, the principal should set explicit, achievable priorities with respect to their use. For example, their use in foreign language instruction should be as important as in any other part of the curriculum. Their use to minimize the distance between the "haves" and "have-nots," and to providing more individualized instruction should be clear goals to which leadership is given so that CAI and CMI functions are performed and their benefits realized.

- Schools should make available through conferences and workshops, information on the sensible uses they are making of microcomputers, how they are using them to increase the productivity of teachers, students and administrators. They should show the parents how their microcomputers are helping teachers in their daily record-keeping, how students are benefitted by not only the drill and practice, vocabulary building, reading, and grammar activities provided by the courseware they are using, but also in the development of thinking and communication skills.

PROJECT REPORTS AVAILABLE

Final Report on Needs and Development Opportunities for Courseware for Foreign Language Instruction. Review of the literature, methods and approaches, findings, analyses of the courseware identified, recommendations, bibliography.

Survey Report on Available Microcomputer Courseware for Foreign Language Instruction. A complete listing of courseware for 14 different languages, information on vendors, computer requirements, and reviews.

Survey Report on Mainframe Courseware for Foreign Language Instruction. A list of identified mainframe courseware and where it is being used, on what system, and at what level.